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AUTHOR	Bierschenk, Bernhard
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ABSTRACT

Empirical information is presented on how researchers at Swedish institutes of education perceive, structure, and define educational and psychological problems. The collection, evaluation, and presentation of the results of the study were made on the basis of system theoretic assumptions in that the description and analysis of the initial phase of the research process was made from a micro-ecological perspective. This orientation focuses on the analysis of the constraints that influence the researcher's possibilities for action, and permits the application of a psychological model that emphasizes the researcher's possibilities for action. The model includes the following components: (1) the researcher's motivation, (2) the researcher's perception of problems (i.e. the generation of ideas, norms, and values), (3) the researcher's choice, transformation and structuring of problems, and the generation of hypotheses, (4) the researcher's choice of strategies concerning the search for information, the design and implementation of research plans, (5) the researcher's choice of methods and techniques for information and documentation of research results, design of investigations, collection and processing of data, (6) the researcher's frame of reference (i.e. the extent to which he or she identifies with a particular discipline) and (7) the formal and informal organizations within which researchers work. (EVH)

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RESEARCH PLANNING FROM A MICRO-ECOLOGICAL PERSPECTIVE: SUMMARY OF INTERVIEW STUDY

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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This report presents a summary of an interview study. The purpose of the study has been to obtain empirical information on how researchers at institutes of education perceive, structure and define educational and psychological problems. The collection, evaluation and presentation of the results of the study have been made on the basis of system theoretic assumptions.

Indexed: Research policy, system analysis, interview, empirical research, the theory of general systems, concept formation.

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1. PLANNING EDUCATIONAL RESEARCH

"The freedom of the researcher" is a constantly recurring concept in debates and arguments concerning research policies. But since the concept is of a decidedly woolly nature, it can be used by both researchers, research administrators and politicians when they want to defend the stand they have taken or advance their positions, while at the same time each one interprets the implications of the expression to his own advantage. It should be made quite plain from the start, therefore that in this account we shall make no attempt to describe or interpret the freedom of the researcher. Instead we shall try to establish how personnel resources can be utilized better and how they can be linked to technical and economic resources, and how research programmes can be designed so as to lead to a qualitative improvement in Swedish educational research.

An examination of the researcher's possibility of choosing problem-oriented research strategies contra personal and environmental restrictions involves linking the discussion of the conditions of research to the researcher's immediate surroundings. This micro-ecological starting point should be particularly helpful when relating the goals of research policy to the concrete implementation of research plans.

This attempt to describe the research and the researcher's conditions from a micro-ecological perspective is motivated by the circumstance that various interested parties are in a disturbing way separating the goals of research policies from such problems as are connected with a realization of research plans. The "gatekeepers" of research seem to want to close their eyes as far as possible to the fact that personal and technical resources, plus concrete measures, are needed if plans are to become reality. From a micro-ecological perspective it is practical details such as the dissemination of information, the engagement of staff, arranging offices and workplaces, and obtaining or building instruments that decide whether and to what extent research policy ideas and visions can be fulfilled. Competent research workers cannot, for example, be suddenly shaken out of thin air. The "personal research resources" in the form of elaborated competence that are available is decided wholly by a long-term research policy on the welfare of personnel. But such practical details are often neglected, perhaps owing to our lack of systematic knowledge of the researcher's immediate environment.

A systematic description and analysis of the initial phase of the research process from a micro-ecological perspective has the following two purposes:

1. to apply a psychological model that pays special consideration to the researcher´s possibilities for action and
2. to focus the analysis on the constraints that influence the researcher´s possibilities for action.

This theoretical starting point is based on Ackoff and Emery´s (1972) work, "On purposeful systems". It works on the assumption of purposeful and intentionally acting individuals that interact continually with their environment. It is assumed that the individual can choose to perform one action among many alternative possible actions. The individual´s possible actions are however restricted in effect by both personal and environmental factors. But since research policy decisions often aim at increasing, diminishing or redistributing the individual´s possible choices, it should be particularly desirable to have the conditions of research empirically illuminated and quantified.

An attempt at quantification and systematic analysis has been presented in Bierschenk (1974). The model according to which this study has been designed includes the following components:

1. The researcher´s motivation, i.e. his aims and intentions.
2. The researcher´s perception of problems, i.e. generation of ideas, norms and values.
3. The researcher´s choice, transformation and structuring of problems, and generation of hypotheses.
4. The researcher´s choice of strategies concerning the search for information, the design and implementation of research plans.
5. The researcher´s choice of methods and techniques for information and documentation of research results, design of investigations, collection and processing of data.
6. The researcher´s frame of reference, i.e. the extent to which the researcher identifies with a specialization, with a particular discipline, with an inter-disciplinary grouping or invisible colleges.
7. Research organizations, both formal and informal, within which researchers work.

Starting from the problems of practical action means that we wish to study researchers and the technical resources of research, together with the environment defined by a space and time axis. In this both researchers and technical aids move from task to task along continuous paths. From the perspective of research psychology, it should be important to gain some clarity on the degree of mobility and combinability of both the researchers and the technical resources.

2. SOME METHODOLOGICAL PREREQUISITES

The use of a given research strategy and certain special techniques for both data collection and data analysis and for statistical processing always implies a (hopefully) conscious choice. But it also means a focussing on our systematic search for new knowledge and a decision, which is made for the purpose of reducing as far as possible the influence of various conceivable sources of error.

2.1 Researcher population and random sample

The research results that will be presented below are based on forty randomly selected researchers from a researcher population. The following criteria must be fulfilled for a person to be considered a researcher belonging to the population of the investigation. A researcher is a person who (1) has studied the behavioural sciences, (2) has taken at least a licentiate degree, (3) is connected with an on-going, recently started or completed project, seen from the perspective of 1972, (4) belongs to or is connected with at least one of the (then) eleven departments of educational and psychological research in Sweden, (5) is resident in Sweden and (6) has been included in one of the catalogues listing social science research or staff employed at the departments. These catalogues must have been published during the period 1967-1972. Catalogues presenting developmental work, experimental work and reform work are not counted.

For a detailed description of the population and random sample and for an account of the data collection and the analysis results see Bierschenk (1974). Since this report forms the foundation for large parts of what is presented here in a compressed form, no individual references will be given.

2.2 Data collection

If we assume that it is only individuals (and not groups, organizations or machines) that can formulate problems of interest to a scientific analysis, it becomes necessary to let individual persons express themselves freely. We chose to use an interview method for the collection of data. This choice was made in the context of the assumption that the researcher´s chance to give free and unrestricted answers would provide information of high validity, at least as long as we can assume that the researchers are seriously interested in participating in the study. But we also constructed an assessment schedule for the purpose of (1) getting the researchers´ views in a "summarized" form, (2) getting the researchers´ reactions to the use of assessment schedules in this context and (3) getting the researchers´ possible suggestions for improvements and comments on wordings and statements in the schedule. The analysis results that will be presented are thus based partly on an analysis of text and partly on an analysis of data in the form of assessment scores. The text ma-

terial has been studied both impressionistically by Annerblom (1974), and by means of a method for computer-based content analysis by Bierschenk & Bierschenk (1976).

3. MOTIVATION

Motivation is the basic component in our concept model. It represents the dynamics of motivation that are assumed to control both the different phases (perception, structuring and definition) of the process of problem formulation and the individual researcher's development of behavioural strategies.

In an initial attempt to operationalize the motive factor, mainly open-ended questions were put. This approach was intended to prevent any premature limitation of the motives that the researchers identify and describe. Primarily we wanted answers to the following questions:

1. What fundamental motives do the researchers have for devoting themselves to research?
2. What goals do the researchers wish to attain with their research?

The impressionistic content analysis shows that the motivation component is many-sided and that the answers are given on many different levels of complexity. The answers to the first question could be summarized by saying that the most important motive for doing research is a strong ambition to achieve results and to solve problems. The researchers find distinct advantages in such work. Research is described as the "most pleasant torment imaginable". Another motive given for doing research is that "it is advantageous to get paid while one is studying". One driving force is said to be that "despite everything research is a free job with a certain amount of freedom of movement and it is nice not to have people over you". But the researchers also motivate their interest in research by saying that the work situation itself "releases motivation" and that they do research because they are curious and because the task itself is stimulating. In addition they express a need for classification and consistency and a need to reach tangible results. Finally one motive given is that they wish to learn new things and that the solution of problems is experienced as something positive.

In the answers to the second question, the researchers' motives can be summarized as that they have "experienced the needs of the educational system at close range", that they want to influence the decision-makers by pointing out actual states of affairs, they want to change the framework for the school of today, remove boring elements from the teaching and achieve better working conditions for the teachers. They also wish to help disfavoured groups in society, perhaps even "improve the world".

4. PERCEPTION OF PROBLEMS

An inescapable element in every problem is "ideas". Ideas (or problems) are however only noticed insofar as they are felt to be relevant. Thus there must be people to give ideas relevance and judge them to be important. The most immediate source of ideas and the judge of researchable ideas is the researcher himself. The decision taken by the researcher for or against a problem must be of decisive importance for the formulation of problems. But it should perhaps also be mentioned here that so-called idea-creators or idea-disseminators or initiators of research projects need not be the same persons as those designing a problem in such a way that it can be tackled by scientific methods.

For every process of problem formulation it is of fundamental importance that there should be a continuous flow of ideas, but at the same time it is also necessary to make a choice. It is primarily the researcher's norms (either written or implicit) and his values that exercise a strong element of control over the selection of suitable ideas.

As far as the researcher's perception of ideas is concerned, we want foremost to get answers to the following questions:

3. What ideas (suggestions) do the researchers develop further?
4. Which sources of ideas are stated on the whole?
5. Which values, beliefs and norms do the researchers develop?
6. Which persons select ideas (project outlines) and plan the research project?

Annerblom's (1974, p. 13-14) impressionistic content analysis suggests that the researchers primarily pay attention to ideas coming from earlier projects. But ideas also seem to come from the researchers' own experiences as teachers or psychologists. Ideas for the development of a problem area, on the other hand, seem to come more seldom from pure methodological or theoretical interest.

When the researchers were asked to decide more exactly where the idea for the project had come from, it emerged that it was only in exceptional cases that the researcher alone had produced an idea. Annerblom's (1974, p. 26) evaluation of the interview material shows that ideas for research projects at departments of educational research ususally come either from professors and scientific leaders or from persons representing authorities such as directors of education and school inspectors. Central authorities such as the National Board of Education, the National Social Welfare Board and the Nordic Council are also named as having made suggestions.

With regard to the norms, beliefs and values that have guided the choice

of a particular idea, the interview answers show the following: The primary reason why researchers at departments of educational research "choose" to do research around an idea or a problem complex is said to be the chance of obtaining an appointment, within which they are expected to carry out a particular assignment. Pressure from authorities and directives from authorities and individual persons are further important factors that have been mentioned.

No uneqivocal answer beyond what has already been said can be given to the question of which persons select ideas (project outlines) and plan research projects. Usually it seems as if a number of persons at the department and/or from an authority have taken part in discussions that have led to a suggestion. The initiative to such discussions seems to be taken equally often by professors or scientific leaders as by an authority. But in many cases it is still unclear who finally reaches the decision that the outline of an idea is to be given the status of a project by being allocated a research grant.

5. CHOICE OF PROBLEMS

There has been a substantial increase in empirical research at the departments of educational research in Sweden during recent years. This increase concerns mainly research that has been "commissioned" by central authorities. When it comes to the researchers' choice of problems, we try to obtain answers to the following questions:

7. What types of problem do the researchers handle?
8. How do the researchers think around the problems?
9. What forms have the researchers developed for structuring their problems?
10. To what extent do the researchers define the problems in the form of hypotheses that can be tested empirically?

Swedish school research is dominated by commissioned research, which is characterized by broad questions. By giving primarily short-term assignments, the main granting authority, the National Board of Education, lays a foundation for central decisions. This steering of research is a central point of discussion in the debate on research policy.

In general it can be said that the researchers consider that research should be carried out on problems of a comprehensive nature, e.g. the goal for the entire school system, and that it would be positive if a research task could be focussed on inter-disciplinary problems. A basic feature in the answers is that the researchers would prefer not to be tied down to one area and that they consider it difficult to decide whether one sector is more important than another. Annerblom (1974, p. 19) writes:

"Several researchers are of the opinion that it is impossible to distinguish between theory and practice in research. They consider that there is no theory without application and vice versa."

Researchers and laymen are generally of the opinion that a scientific discipline cannot achieve high quality research without having fundamental research work as a foundation. Here the conviction of the writer is that it is of subordinate importance for the research if the debate on research policy occasionally uses the concept basic research or if it breeds new nomenclatures such as goal-focussed basic research, long-term research, long-term motivated research, theory-oriented research or high-risk research.

What is important for the research is that the research resources are controlled in such a way as to make it possible for behavioural science research to handle increasingly large problem complexes, since it is these that indicate the development level of the research. When the researcher is to carry out

scientific investigations he must be able to handle original problems, routine problems and practical problems. This is a criterion that applies irrespective of whether an investigation is said to belong to the category "basic research" or "applied research".

Research implies taking a risk regarding the outcome of the research project. Over-cautiousness and a fear of innovations should therefore have a detrimental effect on the possibilities of composing groups of researchers that would be able to carry out complex research tasks, preferably in the form of commissions. With regard to the risk level of the research problems, the researchers consider that 27% of their research is of an "adaptive" nature, that 45% can be described as explorative and that only 28% of the research they do involves any great risk on the part of the fund allocator. Expressed in terms of basic research, applied research and development work, the researchers consider that only 25% of the work done within the types of project on which the interviews are based consists of basic research. Since the concept "basic research" shows a positive relation with the concept "high-risk research", this means that basic research is related to risk-taking.

The stand taken by the researcher for or against a problem (complex) must have a decisive effect on the formulation of the problem. As a first indication of which types one feels to be most attractive, we obtained the following ranking:

New and important fields, e.g. inter-disciplinary studies such as "brain and behaviour".
Development of models or "general principles" that can be applied to a multitude of situations, e.g. information models.
Well-demarcated areas, despite the risk of limitation, e.g. experimental problems.

The development of models or "general principles" is admittedly placed second, but a mean value assessment shows that the researchers at departments of educational research are rather neutral to this alternative.

Researchers who have taken their Ph. D degrees prior to 1966 consider that they are doing basic research in about 70% of their reference projects. In each case they have permanent appointments as professor, associate professor or university lecturer. The researchers at the schools of education estimated that only 17% of their reference projects consisted of basic research, while the researchers at the universities assessed it at about 50%.

At the same time 70% of the development work done within the projects has been proved to be carried out by part-time assistants. Development work obviously normally requires a larger staff. It seems as if at present basic research is largely carried out as a kind of hobby activity by persons who are sufficently

independent financially to be able to devote themselves to such research. This interpretation is supported by the fact that the researchers, when they are faced with the choice of doing development work or more fundamental work, express the desire to "inquire and research around more fundamental problems" than is possible within the present project research.

6. CHOICE OF STRATEGIES

Scientific problems are parts in a system of problems. They form a group of problems with mutual logical relations. One essential task for the researcher is to develop a strategy that will make it possible to discover and modify the logical order of the problems. The researcher's ability to observe and capacity for insight into the process of problem formulation is of fundamental importance for the development of a problem-oriented research strategy. A strategy states namely the order in which different items are to be carried out. We wanted to use the interview study to get answers to the following questions:

11. To what extent is the researchers' information-searching important for how the problems are formulated?
12. Which strategies do the researchers use or develop when searching for information?
13. How do the researchers evaluate the relevance of the information?
14. Which research strategies are important for how the researchers formulate problems?
15. To what extent do the researchers wish to develop new strategies?

Strategies are developed in the context of a (project) plan. Despite the fact that the choice of such a plan, as shown in the previous chapters, is not usually associated directly with the researcher's immediate environment, this environment unavoidably affects his attempts to implement his plan. The design of a research strategy is controlled by a project plan, which owing to its often very fragmentary nature requires information-seeking.

On the first three questions Annerblom's (1974, p. 29-34) analysis of the interview material provides the following answers:

"Careful systematic checking of research publications is the exception rather than the rule. It is unusual for one afternoon a week to be devoted to checking what is being done at other institutes."

It also happens that researchers first gather data and then try to find suitable literature. Nor is it unusual for information-seeking to be preceded by some kind of concept analysis. There is a general demand for systematic surveys and better information on what is being done within Sweden and less dependence on American literature. In a few cases there is a positive reaction to obtaining advice from others. The general impression, however, is

"that these contacts do not play a particularly important role in the study in one means that the contacts should have led to a complementary exchange of information".

The extent to which the information available influences the design of the

research strategy depends on how the researcher evaluates the relevance of the additional information. In an initial attempt to operationalize this problem complex, the researchers have been asked, as a complement to the open-ended questions, to assess the extent to which they have looked for different types of information during the initial phase of the project.

The assessment shows that the researchers primarily look for information that can help them to develop an idea, so that the product becomes a well-facetted problem, the different facets of which are suited to scientific attack. Information for demarcation of concepts appears to form a very special type, since it is not looked for together with other information that is of importance for the development of the research strategy, such as opinions and interpretations, empirical relations and evidence, norms and conventions, measuring instruments or methods for the processing of data that is to be collected. Our analyses show a negative relation.

It should be possible for problem discussions to be the main source since the researchers primarily try to find bibliographic references via different channels of information (symposiums, libraries, reference organs, reference groups, persons and handbooks). In any case the researchers do not appear to seek information on research methods while the problem discussion is underway or when information for demarcation of concepts is being sought. The impressionistic analysis, the evaluation of the assessment schedule and the computer-based content analysis all give this result. This interpretation is also supported by all the critical viewpoints expressed on printed information material. Ideas and suggestions do not appear to be very easily accessible via this type of information. Nor is the information on research methods that is available in handbooks and works of reference used to any great extent, since such information is sought first and foremost from tutors and fellow-researchers.

The process of problem formulation is largely dependent on the researcher's information-seeking behaviour and his will to penetrate the research literature in his own field. It is conceivable that this behaviour reflects a more fundamental attitude to the research process, insofar as theoretically oriented researchers to a greater extent make use of written information than more praxis-oriented researchers do. Our result analyses suggest that there are two groups. The first group seems from the start to aim at research work that leads to a deeper theoretical competence and makes use of the library roughly once every three months. The other, more praxis-oriented group, does not appear to have any great need for a library. They make use of the library once every six months or year.

An examination of the extent to which different research strategies have been used shows, in complete agreement with what has emerged in connection with other types of research, that only the older researchers make use of more advanced research methods. Annerblom's (1974, p. 50) analysis shows that it is experiments and empirical studies that recur in the open-ended answers. But group-dynamic working methods are also mentioned and historical-comparative strategies. Some researchers comment:

"I cannot understand how one can be either or...! The method preferred depends on the research assignment."

Science is regarded not as a definable object or a definable set of problems, but as a strategy for attacking problems. The underlying motives for formulating a problem decide, however, which strategies can be considered suitable. A research strategy becomes explicit by e.g. the researcher's decision on special investigatory methods and his choice of suitable techniques for the purpose of reaching a scientific goal. This latter question will be further discussed in the next chapter.

In addition to a number of necessary routines, the everyday life of the researcher contains a great many other factors that determine the extent to which more or less long-term projects can be realized and the degree to which the researcher's behaviour-strategies can be influenced without ongoing projects being pushed over the critical line, beyond which continuing with a project seems meaningless.

Annerblom's (1974, p. 42) content analysis of the interview material leads to the conclusion that the primary and completely dominating factor is the conditions of employment. She writes:

"Almost all the researchers are affected by the insecure employment situation. 'It is indenfensible that the researcher must live in such a state of insecurity, many of us are appointed for six months at a time. And we have no idea what will happen when the project funds are gone, the security requirement is plainly unsatisfied.

Take, for example, the wretched situation for lecturers. We have masses of qualified researchers here, working hard for little payment, and then after a number of years they suddenly stand there with no means of support - it is irresponsible. The insecurity of appointment is irritating just because young research assistants and lecturers who could criticize society are helt back by being appointed a year or so at a time.

As a result of the insecurity, there are also certain ideas that get lost, that one simply does not dare to follow up. The decisive factor is the economic conditions under which most people live here at the university. Indeed, if the people occupied with research had research appointments with an acceptable degree of social security, I believe it would in many ways make our work easier, since there would be less carelessness and less stress.'"

Within the framework of the reference projects included in the study, 34% of a total of 273 persons are employed full time, wnile 66% have a part-time appointment. Of the researchers, 12.5% have a full-time appointment while 23% do their research part-time. Of the assistants, 12.5% are appointed full-time, while 27% have a part-time appointment. But only a few of the researchers have a permanent appointment.

The need for both "security" and "insecurity" as foundations for scientific achievement is emphasized by Pelz & Andrews (1966, pp. 241-242). But by this they mean intellectual conditions. The research data presented by the writers do at the same time indicate, however, that:

> "Scientists must have a certain level of personal security of self-confidence, an insecure or anxious scientist would stick to 'safe and sure' solutions./.../ Given an atmosphere of anxiety, though, relatively little uncertainty could be tolerated."

In this sense the staff policy now prevailing does not at any rate favour the flexibility intended within the organization of educational research. Still less can this insecurity have a motivating effect on achievement, creative thought and critical analysis. A marked sign of this is that there is an almost total lack of scientific debate.

Moreover many researchers consider that it is difficult to maintain a balance between private life and research. Annerblom (1974, p. 42) writes:

> "One does not do research in office hours, 'private life and work mingle with each other', it isn't just a job where you work between 8 - 5 and then close down'. Effective research cannot be done in office hours."

It emerges plainly from the interview material that most of the researchers desire a permanent appointment. In addition they would like greater freedom in selecting problems and that there should be more generous time limits.

The conditions defined by the scientific community (internal research criteria) and the research policy followed regarding educational research (external research criteria) obviously create serious conflicts. An attempt at quantifying the researchers' experiences of conflict shows that they have experienced relatively few conflicts when choosing problems. The choice of suitable research strategy leads to considerably more conflicts. Most conflicts arise as a result of the narrow time limits they are forced to work with. If a research strategy leads to sound new ideas, it is probably the rule rather than the exception that this is the result of continuous, and tenacious intellectual work, which can stretch over years. And it is in no way self-evident that this can be replaced by lists of problems experienced such as the consumers of research sometimes compile.

7. CHOICE OF METHODS AND TECHNIQUES

Attacking problems involves among other things a conscious steering or search for knowledge, which is carried out with a resolute determination to apply measures that to the greatest possible extent diminish the effect of various sources of error. This is checked against criteria that have been decided upon by the Scientific Community. In an attempt to map which methods are used in Swedish educational research, the following questions were formulated:

17. To what extent do the researchers systematically make use of different techniques for information-seeking?
18. Which investigatory techniques are important when the researchers are to formulate problems?
19. Which techniques do the researchers use in data-processing?

In general, researchers and students are given a comprehensive schooling in the planning, implementation and evaluation of empirical studies. As far as the researchers´ systematic use of methods or techniques for a systematic and continuous information-seeking are concerned, it emerges from Annerblom´s (1974, p. 29-30) analysis that the researchers make use of different sources of information periodically. Moreover the information-seeking varies from project to project. Annerblom establishes:

" The researcher´s attitude to the problems of information is personal and individualistic. Everyone has found his own way of searching for literature and making contacts."

"Personal contacts seem nearly always to have had an inspiring effect, however. Someone has expressed it as preferring personal contacts to a study of the literature. ´...people are more topical than books...´The people with whom they have had discussions have often been persons who have in some way been associated with the project, discussions with colleagues or the other members of the project being mentioned less often."

When the researcher seeks information he must have access to suitable channels of information. For the purpose of quantifying the researcher´s view of and assessment of a number of channels of information, assessments were made regarding both the frequency of use and the value of the information. The evaluation shows that the researchers primarily make use of such channels of information as necessitate personal contacts in the searching. Thus research information is mainly mediated by departmental libraries, by direct contacts with research colleagues, by telephone calls or written enquiries and by the use of reference groups. More indirect contacts with other libraries are often made through the departmental library. The fact that the library is not used to any great extent is motivated by (1) the age of the researchers, (2) that there was no need for literature, (3) that the library is too far away or that one "...expected absolutely nothing of library information..." In many cases

the use of the library seems to depend on the researchers being on a good footing with the library staff.

Reference organs such as ERIC, Psychological Abstracts (PA) and others form a group of their own. The researchers seem to use PA most often. Despite far-reaching and comprehensive information campaigns ERIC has obviously attracted little attention, neither the manual nor the computer-based version. From the comments to the evaluation of the reference organs (see Annerblom, 1974, p. 31) it can be seen that the researchers wish for easily accessible information in the form of summaries of current research.

The improvement desired in the existing computer-based systems for information and documentation are a kind of quality judgement. "An evaluation of the references one obtains is what one looks for." In summing up, we can say that the researchers know that computer-based systems of information and documentation exist and have to a certain extent made use of this service, but are "dissatisfied" with it and hope that the system can be improved. When ERIC was compared to PA, it emerged that there was a wish for the same type of information in ERIC as in PA and that the indexed words should be more unequivocally defined.

Finally symposiums at home and abroad form another separate group. They are visited roughly once a year. The evaluation of the information that the researchers have got via different sources of information shows that they value direct contacts most highly. This is followed by libraries. Information received from reference organs and symposiums is valued lowest (though with the exception of symposiums abroad).

The fact that assistants and project leaders without the function of scientific leader have <u>not at all</u> participated in symposiums is very serious for the development of the research process.

The mapping of which research methods are used in Swedish educational research shows that the researchers have only made use of "simple statistical treatment of observations". In addition the assessments show a wide distribution. The other methods are such as are concerned with the planning of investigations and with classical methods in experimental psychology.

8. REFERENCE SYSTEMS

The ability to identify oneself with the research tasks that are to be carried and to make these agree with the expectations and goals one has in life is sometimes called "self-realization". The rapid re-orientations that are often demanded of individual researchers in education owing to the varying nature of the research assignments can sometimes have resulted in individual researchers feeling uncertain with regard to a basic reference group. Perhaps this state of affairs is the reason why the researchers at departments of educational research are so highly attracted to inter-disciplinary research: so as to prevent themselves being placed in a narrow subject category.

In order to study how the researchers at departments of educational research define themselves, we have tried to obtain answers to the following questions:

20. Which reference systems do the researchers consider they belong to?
21. To what extent have the researchers specialized?
22. How does the researchers identification with different sub-systems influence his research strategy?
23. How does the researcher's affiliation to a reference system affect his judgement of the relevance of a problem?

Annerblom (1974, p. 48) gives the following comment and interpretation of the answers received to question 20:

"Education-wise I belong to the pedagogues, emotionally, God knows'./.../
The researchers feel themselves to be pedagogues, but seem nevertheless to be uncertain what a pedagogue really is. They identify with international names. They are well-aware as to what groups they sympathize with, but seem all the same not really convinced over their role in a larger context."

Working on our assumption that the individual's behaviour strategy is partly one function of the structure in the social environment that the individual has learnt to distinguish, we have tried to obtain further clarity in this important question. Depending on the researcher's basic education, one can namely imagine an identification with a certain subject, such as pedagogics, psychology, sociology etc. Another hypothesis is that the researcher has extended his frame of reference and defines himself in a more cross-disciplinary fashion as behavioural scientist, with the import pedagogue & psychologist & sociologist.

The researchers at the departments of educational research in Sweden can be divided into two main groups, namely (1) researchers with a strongly socio-psychological frame of reference with some roots in biological and physiological theories, and (2) researchers who only to a small extent consider themselves to have this frame of reference. Researchers aged between 44 and 50 largely identify

with pedagogues and teachers. This identification is noticeably less among younger and older research workers. Since it is mainly the first group that has had basic teacher training, it seems to be that background that is of decisive importance for the identification. In no group is there any desire for change in the reference system.

Concerning the identification with research methods, it emerges from the analysis that the researchers who are either scientific leaders and project leaders or assistants identify to a moderate extent with the specializations, survey expert and measurement scale technician. The only researchers who identify to a large extent with research planners are those who are both scientific leaders and project leaders.

Research implies a systematic search for new knowledge. If new methods and techniques are not developed and applied, there is little hope of acquiring new insights and new knowledge. This insight seems to be spreading increasingly among researchers in project research. They want a change towards a greater depth in research methods.

9. ORGANIZATION STRUCTURE

It is often very difficult to determine the exact source of an idea or a problem that is felt to be a relevant subject for research. The person or persons supporting an idea can be found in various organization structures, in which they can hold either (1) formal or (2) informal positions.

Research institutes form the outer frame within which research processes are developed. Within this frame projects function as the smallest unit (with a relatively loose organization). But different political and administrative structures that surround research institutes have the effect of controlling the research process.

Since the historical development of the Swedish departments of educational research differs considerably from that of other European countries, a few features will be briefly described. In Sweden the first Chair of Education was instituted in 1910. Psychology developed within this subject and was up to 1955 linked to education. The Chairs were often named "Education and educational psychology" or "Psychology and education". Not until the beginning of the 1960's were the departments expanded and then in the context of the Schools of Education. There are now thirteen departments of educational research in the country (see Bjerstedt, 1976, p. 23-24) where nearly all educational research is carried out. This research has a marked bias towards behavioural science. Almost no historical or humanistic research occurs and the preference of the researchers for methods associated with behavioural science and basic statistical knowledge can be seen clearly in the interview material. The research projects at the individual departments are almost without exception problem-oriented with a strong trend towards what is sometimes called "client-oriented" research.

The process of problem formulation develops by definition within different institutional environments and is thus influenced by existing institutional limitations. To these are added various central authorities that try to influence the process of problem formulation. The demands made by persons holding central positions of authority that they also be consulted have increased continuously. We have tried to map this influence by answering the following questions:

24. Which persons influence the process of problem formulation?
25. Which persons support ideas for project outlines?
26. Which authorities influence the process of problem formulation?

The way in which the process of problem formulation is developed within a project depends on the social relations that exist between the members of a project.

Projects are usually characterized by the following organization structure: A scientific leader is responsible for the scientific quality of the project. The project leader is responsible for the researchers and the office staff working within a project. The functions of scientific leader and project leader can be combined in one and the same person. In addition various kinds of expert knowledge can be associated with a project, without these experts necessarily being employed within a project. Usually experts participating are paid by remuneration.

Annerblom´s (1974, p. 16, 35) analysis indicates that the researchers are rather reserved when getting on to the subject of how the project functions. They all seem to have in common the problem of completing the project within the appointed time. One basic element in the answers on the project work is that

"it is an absolute condition that one is reasonably adaptable...if one cannot communicate one is not a researcher´. And if the social relations do not function, nor does the project."

Annerblom sums up:

"The exchange of thoughts between researchers is limited to that which is absolutely necessary. They consult each other when they are ignorant of an area such as statistics, but meet less seldom to exchange ideas. There is neither time nor place for anything other than purely utilitarian contacts."

In order that we should be able to obtain a quantitative idea of how the researchers´ "social environment" functions, where the strategic points are and which functions are most important, the researchers were asked to state which persons they had been in contact with during the various phases of the problem formulation process. There are an unproportionally higher number of contacts within their own departments than between departments. At the university departments most contacts are made during the gathering of ideas, after which the contacts steadily decrease. At the departments at the schools of education the trend is the opposite. Contact is made more frequently and more intensively with other persons, groups or central authorities during the phase of problem definition than during the idea-gathering period. It is only at the departments of educational research at the schools of education that the number of contacts and the intensity of the contacts show the same trend, i.e. they increase in number and frequency.

As far as the design of project outlines, grant applications, routines etc. are concerned, Annerblom (1974, p. 39) says:

"This entire procedure is described very diffusely. The authorities do not steer it directly, but indirectly. The researchers do not let themselves be controlled,

but adapt themselves in accordance with unspoken requirements. In some cases there are no formal regulations for applying for grants. There are no routines that take effect when an application has been turned down. There are few rules of any kind and the entire process from when one applies, designs the project outline, makes contacts etc. is an elusive but also long-winded procedure that disturbs the on-going research work. The critics of the way in which the authorities treat the project outlines point out that they have little ability in making a scientific assessment. One of the clear trends in the material is the negative opinion of the authorities. In general the impression is that the researchers are plainly steered from above by means of almost invisible mechanisms when designing their project outlines, but that they nevertheless partly succeed in carrying out their intentions by various roundabout ways."

We have also quantified the way in which and the extent to which the researchers consider that they themselves have guided the design of the project outline or been exposed to influence from persons within research institutes or authorities. While none of the researchers desire any noticeable control by local authorities, the scientific leaders accept some (moderate) control, probably because they do not at the same time need to feel specially tied down by this. In general a greater measure of freedom leads to greater tolerance towards opinions coming from the outer circles of science.

Within the projects with two or more part-time assistants, 70% of the research activities took the form of development work. Researchers within these projects accept a certain amount of control from local authorities, perhaps owing to the fact that development projects often work inside the municipal schools. The fewer the number of part-time assistants in a project, the less desire there is for control from local authorities. Control can only be tolerated in connection with development work and even then only to a moderate extent.

Educational administrators, teacher trainers, students, trade unions and parents associations should not steer the design of project outlines to any appreciable extent. The researchers also reject any direct or indirect pressure from authorities on the design of future research projects.

The internal scientific steering coming from fellow-researchers within the department was demonstrably much greater at the schools of education than at the universities. The extent to which research colleagues within one's own department should steer the design of project outlines is connected with the researchers' mobility. Those who have been employed at different research institutes have a greater wish for steering. From the point of view of Swedish research policy, this result should be worth keeping in mind, above all considering the lack of opportunity for getting an appointment at any department other than one's own.

Two other factors over which the granting body decides are the problem areas within which the project is to be conducted and the length of the project. The analysis of the results shows clearly that the researchers are not inclined towards tackling new problems of which they have little knowledge if the project is to be shorter than three years. When a project is to be longer than three years, the project leader and assistants are those most prepared to take it on. Experts and post-doctoral researchers not linked to the project administration are noticeably more reserved. This result probably arises from the fact that specialization does not permit erratic jumps from one problem area to another.

Moreover, projects with two or more full-time workers seem to encourage new ideas more than projects with only one or no researchers with full-time appointments.

Finally all the researchers consider the requirement of practical application to have a negative effect on the process of problem formulation.

10. THE MICRO-ECOLOGICAL STRUCTURE OF EDUCATIONAL AND PSYCHOLOGICAL RESEARCH

The description of the initial phase of the research process given in Chapters 2 - 9 is based on the application of a comprehensive concept model, based on a theory of general systems. The main components in this model are (1) motivation, (2) perception, (3) problem, (4) strategy, (5) method, (6) reference system and (7) organization structure.

The fundamental starting point is that we study organizations as systems. By the concept system is meant here two or more components that stand in relation to each other. A common situation within research in the behavioural sciences is that a group of persons who have been observed with regard to certain variables are to be divided into a number of unique sub-groups. If we permit our researchers as a whole to decide on the grouping, those that in some sense are alike or "close" to each other will be classified into the same group or cluster. Researchers that are different of "far from each other" will be classified to different clusters.

In this chapter we shall describe a few examples taken from an inductive experiment to find meaningful relations between the ninety variables that define the seven components of the model. The categorization or identification of persons, objects or events is a fundamental and essential behaviour. It requires an analytical approach. It is considerably more difficult to synthesize and create a conception of how they integrate and in which way barriers are created that prevent a person from moving in a particular direction when the field is more open in other directions. This is one of the reasons why our conception of how they integrate is vague. The way in which the individual components in our concept model interact is described below.

The researchers that consider that there should be opportunities within the framework of "departmental research" for administrative posts and that R&D projects should include training for researcher posts, also state that they have made use of psychological creativity methods, e.g. brain-storming or "synectics", i.e. a conscious attempt to create an exchange of ideas and creative atmosphere in a group.

The researchers who are attracted by ideas that are expected to lead to experimental studies and a development of general models think that they have experienced conflicts when choosing between ideas. The conflicts arise when they are forced to choose between ideas that are expected to lead to results acceptable to the Scientific Community (even if they are not particularly remarkable) and ideas that could lead to remarkable but possibly controversial

results. They describe their own projects as high-risk research. By high-risk research is meant research work that leaves the granting authority in great uncertainty as to the results. This research can concern e.g. the testing of different strategies or completely new methods of approach for training new, important functions.

The researchers that within the framework of the school's R&D work can consider working on a short term (less than three years) in areas of which they know little classify their own project as development work. By development work is meant activities concerning the development of new aids and techniques that can help solve acute problems in the daily work of the school.

The researchers that within the framework of the school's R&D work can consider working on a long term basis (more than three years) in areas where they have little knowledge classify their own project as explorative research. By explorative research is meant research work that has been initiated for the purpose of adding to our knowledge of phenomena that are of general interest to the educational system.

The researchers that identify most with psychlogists would, if asked to choose, decide in favour of project outlines within new and important areas (e.g. interdisciplinary studies such as "brain and behaviour") where the details are left to others. They give as their specializations consultant in methodological questions, psychoanalysts (psychodynamic theories), administrators or report disseminators. They consider themselves to be interview technicians and content analysts and they have made use of classical experimental methodology, i.e. a systematic use of hypotheses that are followed by experiments or observations for verification.

The researchers that identify most with sociologists state that the National Board of Education has steered the design of the project outline, while at the same time they have experienced a demand for practical application.

The researchers that identify most with educationalists also identify with teachers. At the same time they state that they have made use of discovery matrices, which involves setting up a general frame or classification to make it possible to discover possible gaps in knowledge.

The researchers that identify most with statisticians and mathematicians give as their specializations random sample technicians, measurement scale technicians, measurement theoreticians, survey expert and research planners.

The researchers that identify most with biologists and physiologists classify their own projects as basic research. By basic research is meant investigations studying objects that are indifferent to the educational system. But

it can also include studies with a relevant content, i.e. studies carried out in experimental laboratories. They have made use of the following research methods: Axiomatic methods, i.e. axioms or postulations are formulated from which theorems are deduced by means of formal logic, strict systematics in the planning of investigation, e.g. PERT or net-planning and morphological methods, i.e. an analytical arrangement of a problem in factors and listing of all possible combinations of these factors.

The researchers who identify most with educational planners say that they find ideas leading to new and important areas the most attractive. But they would choose project outlines leading to thorough studies in depth. They describe themselves as experimenters and say that they have used classical experimental methods, i.e. a systematic way of using hypotheses and experiments or observations to verify hypotheses. In addition they have used combinations of experiments for the purpose of calculating correlations between factors and methods used to minimize the number of observations needed to achieve the intended result. Finally they state that the design of the project outline has been steered by fellow-researchers outside the department, by the Office of the Chancellor of the Swedish Universities and by other staff-members.

The researchers who give as their specialization problem-formulator (problem-presenter) and e.g. "doubter and sceptic" or school psychologist or educator, classify their own projects as adaptive research. The work is concentrated on preserving the existing school system and adapting it to the conditions that exist in society at large.

The researchers that during the process of problem-formulation seek for information about empirical relations and proof also seek at the same time suitable measuring instruments, norms and conventions concerning design and methods for processing the data that is to be collected.

The researchers that during the process of problem-formulation search for information in the form of opinions and interpretations that are usually given in the form of summaries in handbooks and works of reference are most attracted to ideas that can give rise to the development of "general principles" or models that can be applied to a multitude of situations (e.g. information models).

The researchers that have experienced conflict in choosing between ideas that can be used as a basis in the formulation of problems leading to (a) rapid solutions (i.e. one applies a known technique) and (b) solutions on a longer term (i.e. one must first develop suitable investigation techniques) classify their own projects as applied research. By applied research is meant work concerning more realistic conditions than those prevailing in laboratory ex-

periments. Field studies (experiments), in which one tries to transfer new ideas, strategies, methods or material from specific educational situations are counted among this research. In addition they state that they have experienced a conflict between the requirement of carrying out an assignment within a given time limit and the demand that they should take on new assignments on a long term basis.

Each behaviour of the researcher can be described as an interaction between the person and his environment. As a result each research process must to a certain degree be marked by the distinctive character of the researchers. The fundamental question put in this study is: What strategies and techniques are used by researcher at departments of educational research?

The results indicate that selection and formulation are highly individual and that the interchangeability of the researchers must be extremely limited, owing to various specializations and the necessity of long-term planning. In any case no educational research of high quality is going to be created by assigning researchers to commissioned research that should preferrably not take too long.

The fact that the researcher has been made the centre of attention in this account does not in any way mean that the development of the research process is looked upon as a phenomenon that is isolated from the environment - quite the contrary. The researcher has a mutual relation to his environment. The way in which the research process is influenced is summarized in Box 1.

Box 1. Summary: Resources and conditions in research planning

The researcher's inherent resources	How the researcher's resources should be utilized in research planning
1. The researcher has a deep social commitment.	By encouraging new developments which utilize the researcher's ability to judge critically. By giving more secure conditions of employment.
2. The researcher has a strong ambition to solve problems and produce high-quality research.	By establishing research groups that can carry out complex research tasks by exploiting their own (and others') competence in cooperation. By increasing the time factor for the research.
3. The researcher has a strong will to illuminate problems from alternative angles and is thereby prepared to take risks.	By permitting the researcher to structure new areas and develop new research strategies. By permitting new knowledge to be formed without demanding immediate practical application.

Box 1. cont.

4. The researcher has a strong will to plan on a long term	By providing means for long-term projects and By avoiding sudden and unexpected changes of course.
5. The researcher has a pronounced need for a deeper knowledge of research methods.	By providing opportunities for deeper methodological and statistical knowledge in order to prevent one-sided and routine application of research methodology. By encouraging the development of new research strategies that can lead to sound ideas in the problem formulation being developed.
6. The researcher has a need of continuity and consistency and to be able to work systematically.	By planning research financing so that the projects can work with permanent full-time researchers. By providing training in the systematic treatment of information on the behavioural sciences. By systematizing publications and publishing within different areas, primarily in Sweden.
7. The researcher has a preference for overall problems and wants to be able to develop general principles	By giving priority to larger problem complexes and basic research. By reducing the demand for practical application.
8. The researcher has a preference for cross-scientific research and for opportunities for researcher-exchange within the country and between countries.	By creating appointments that extend over several subjects (integrated). By constructing more flexible appointments. By opening the doors between faculties and subjects
9. The researcher is assignment-oriented and finds it difficult to leave incompleted projects.	By waiting for research results until the researcher considers an assignment to be completed and hereby By granting means for various kinds of following up.
10. The researcher is problem-oriented and prepared to work within different areas.	By extending the frames towards larger socially oriented problems and By trusting the researcher sufficiently to let him choose for himself. By diminishing the influence of central authorities on the process of problem-formulation. By giving the authorities a certain amount of co-influence in the development work alone.

Box 1. cont.

11. The researcher is curious and prepared to change his research identity.	By giving greater opportunity and means for project staff to take part in conferences both within and outside the country and to distribute these opportunities between all categories of research staff. By increasing the turnover of appointments.
12. The researcher is open to suggestions from other persons and organizations.	By starting a dialogue between the granting authority and the researcher before the problem-formulation begins. By providing insight into the granting procedure. By creating routines that come into force when a research project is turned down.

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This report presents a summary of an interview study. The purpose of the study has been to obtain empirical information on how researchers at institutes of education perceive, structure and define educational and psychological problems. The collection, evaluation and presentation of the results of the study have been made on the basis of system theoretic assumptions.

Indexed:

1. Research policy
2. System analysis
3. Interview study

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